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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* TIMOTHY DONOVAN, SHAFIQ M. JAMAL, YOUNGHUA  
SONG, CHIA-CHUN CHUNG, TAM TRAN, and LAWRENCE TSE

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Appeal 2009-004374  
Application 10/650,887  
Technology Center 2600

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Decided: April 30, 2010

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Before JOHN C. MARTIN, JOSEPH F. RUGGIERO, and ELENI MANTIS  
MERCADER, *Administrative Patent Judges*.

MARTIN, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134(a) from the Examiner's  
May 21, 2007, non-final rejection of claims 1-92, 94-104, 106-15, 117-22,

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134, 136-55, 157-67, 169-78, 180-85, 197, 199-238, and 253-58, which are all of the pending claims.

We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

*A. Appellants' invention*<sup>1</sup>

Appellants' invention is a wireless Ethernet network device having active and low power modes. Specification [0006].

The device can be used in an infrastructure mode, as shown in Figure 1 (which includes an access point 32), or in an ad hoc mode, as shown in Figure 2 (*id.* at [0026], [0028]).

The wireless network device includes a first voltage regulator for regulating the supply voltage during the active mode and a second voltage regulator for regulating the supply voltage during the low power mode, with the second voltage regulator dissipating less power than the first voltage regulator (*id.* at [0006]). A medium access controller (MAC) device selects the first voltage regulator during the active mode and the second voltage regulator during the low power mode (*id.*).

Figure 3 is reproduced below.

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<sup>1</sup> References herein to Appellants' Specification are to the Application as filed. There is no corresponding Patent Application Publication.

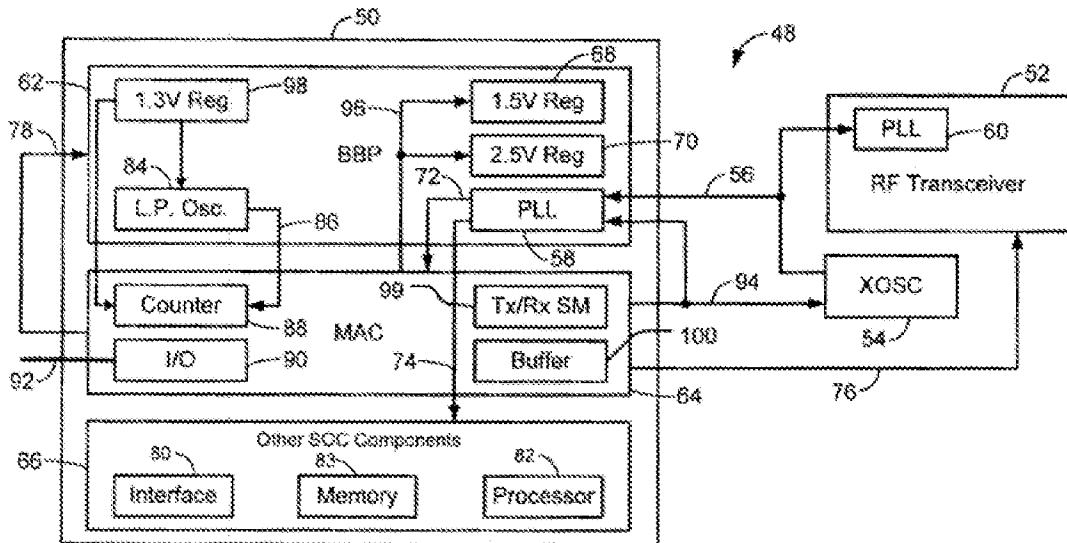


FIG. 3

Figure 3 is a functional block diagram of an embodiment of a wireless network communications device in accordance with Appellants' invention (*id.* at [0019]). As shown in this figure, wireless network communications device 48 includes an SOC (system on chip<sup>2</sup>) circuit 50, an external radio frequency (RF) transceiver 52, and a crystal oscillator (XOSC) 54 (*id.* at [0030]). SOC circuit 50 includes a baseband processor (BBP) 62, a medium access control (MAC) device 64, and other SOC components 66 (*id.* at [0032]).

## <sup>2</sup> Specification [0002].

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Digital voltage regulator 68 and analog voltage regulator 70 in BBP 62 operate only during the active mode, and voltage regulator 98 in BBP 62 operates during the low power mode (*id. at [0039], [0040]*). If desired, the lower power voltage regulator 98 can also be powered during the active mode (*id. at [0054]*).

#### *B. The claims*

There are twenty-three independent claims before us: claims 1, 18, 26, 31, 48, 56, 61, 78, 86, 91, 103, 114, 134, 145, 154, 166, 177, 197, 208, 217, 226, 233, and 253.

#### *C. The references<sup>3</sup>*

The Examiner relies on the following references:

Jokinen	US 5,774,813	Jun. 30, 1998
Chapman et al. (“Chapman”)	US 5,845,204	Dec. 1, 1998
Kohlschmidt 2000	US 6,029,061	Feb. 22,
Shi	US 2003/0132881 A1	Jul. 17, 2003
Karaoguz	US 2004/0029620 A1	Feb. 12, 2004
Aoyama	US 6,763,471 B1	Jul. 13, 2004
Amos	US 6,934,870 B1	Aug. 23, 2005

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<sup>3</sup> Because the availability of the references as prior art against Appellants’ claims is not at issue, only the issue or publication dates are being provided.

*D. The rejections*

The statements of the grounds of rejection are listed below in the order in which they are stated in the Answer. In some cases, the same ground appears in more than one statement. Appellants' arguments are limited to the independent claims.

1. Claims 134, 136-53, 197, 199-216, and 253-58<sup>4</sup> stand rejected under 35 U.S.C. § 112, second paragraph, for being indefinite. (Answer 2, 54.)
2. Claims 1-4, 6, 8, 9, 13-16, 18-22, 24, 25, 31-36, 38, 39, 43-46, 48-52, 54, 55, 61-64, 66, 68, 69, 73-76, 78-82, 84, and 85<sup>5</sup> stand rejected under 35 U.S.C. § 103(a) for obviousness over Jokinen in view of Karaoguz and Aoyama (*id.* at 3-4).
3. Claims 5, 7, 10-12, 17, 35, 37, 40-42, 47, 65, 67, 70-72, and 77 stand rejected under § 103(a) for obviousness over Jokinen in view of Karaoguz, Aoyama, and “Appellant’s admitted prior art” (“AAPA”) (*id.* at 13).
4. Claims 23, 53, and 83 stand rejected under § 103(a) for obviousness over Jokinen in view of Karaoguz, Aoyama, and Chapman (*id.* at 15).

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<sup>4</sup> The Brief (at page 16) incorrectly includes canceled claims 246-52 in the claims rejected on this ground.

<sup>5</sup> Claims 73-76, 78-82, 84, and 85 are incorrectly identified as “73-82, 74-76, 78-85” in the statement of the rejection at page 3 of the Answer.

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5. Claims 26-30, 56-60, and 86-90 stand rejected under § 103(a) for obviousness over Jokinen in view of Karaoguz and Aoyama (*id.* at 16).

6. Claims 91, 92, 101, 102, 154, 155, 164, 165, 217, 218, 224, and 225 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Amos and Shi (*id.* at 18).

7. Claims 94, 157, and 219 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Amos and Chapman (*id.* at 21).

8. Claims 95-97, 100, 158-60, 163, 220, and 221 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Amos and Aoyama (*id.* at 22).

10. Claims 98, 99, 161, 162, 222, and 223 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Amos and AAPA (*id.* at 24).

11. Claims 103, 104, 106, 107, 111-13, 166, 167, 169, 170, 174-76, 226-228, 231, and 232 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Amos, Aoyama, and Shi (*id.* at 25).<sup>6</sup>

12. Claims 108 and 171 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Amos, Aoyama, and Chapman (*id.* at 30).

13. Claims 109, 110, 172, 173, 229, and 230 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Amos, Aoyama, and AAPA (*id.* at 31).

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<sup>6</sup> Of these claims, claim 231 depends on claims 229 and 230, which stand rejected over Kohlschmidt in view of Amos, Aoyama, and AAPA.

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14. Claims 114, 115, 120-22, 177, 178, 183-85, 233, 234, 237, and 238 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Amos, Aoyama, and Jokinen (*id.* at 32).

15. Claims 117 and 180 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Amos, Aoyama, and Chapman (*id.* at 36).

16. Claims 118, 119, 181, 182, 235, and 236 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Amos, Aoyama, and AAPA (*id.* at 37).

17. Claims 134, 137 139-43, 197, 200, and 202-06 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Aoyama and Jokinen (*id.* at 39).

18. Claims 136, 144, 199, and 207 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Aoyama, Jokinen, and Amos (*id.* at 43).

19. Claims 138 and 201 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Aoyama, Jokinen, and Chapman (*id.* at 45).

20. Claims 145, 146, 151, 152, 208, 209, 214, 215, 253, 254, and 257<sup>7</sup> stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Aoyama and Jokinen (*id.* at 46).

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<sup>7</sup> Claims 253 and 254 are incorrectly recited as “253-224” at page 46 of the Answer.

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21. Claims 147, 153, 210-16, and 258 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Aoyama, Jokinen, and Amos (*id.* at 50).

22. Claims 148 and 211 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Aoyama, Jokinen, and Chapman (*id.* at 52).

23. Claims 149, 150, 212, 213, 255, and 256 stand rejected under § 103(a) for obviousness over Kohlschmidt in view of Aoyama, Jokinen, and AAPA (*id.* at 52).

#### CLAIM GROUPING

Appellants, for the purpose of argument, have divided the claims into Groups A-H. Group A (identified by heading “A” at page 16 of the Brief) consists of the independent and dependent claims that stand rejected under 35 U.S.C. § 112. Groups B-H, which address the § 103(a) rejections, include only the independent claims. Appellants (e.g., Br. 21) treat the dependent claims as standing or falling with the independent claims in arguing the § 103(a) rejections. The claims are grouped as follows:

Group A: Claims 134-53, 197-216, and 253-58 (including independent claims 134, 145, 197, 208, and 253) (Br. 16);

Group B: Claims 1, 18, 31, 48, 61, and 78 (*id.* at 17);<sup>8</sup>

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<sup>8</sup> The inclusion of claims 134, 145, 197, 208, and 253 in Group B at page 17 of the Brief is assumed to be an error because claims 134 and 145 are separately argued as Group C claims, claims 197, 208, and 253 are separately argued as Group D claims, and the Group C and Group D (Continued on next page.)

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Group C: Claims 134 and 197 (*id. at 21*);  
Group D: Claims 145, 208, and 253 (*id. at 24*);  
Group E: Claims 26, 56, and 86 (*id. at 26*);  
Group F: Claims 91, 154, and 217 (*id. at 28*);  
Group G: Claims 103, 166, and 226 (*id. at 29*); and  
Group H: Claims 114, 177, and 233 (*id. at 30*).

## THE ISSUES

The issue raised by Appellants' arguments<sup>9</sup> regarding the § 112 rejection is whether the phrases "first wireless circuit" and "second wireless circuit" in the rejected claims renders them indefinite.

The various issues raised by Appellants' arguments against the § 103(a) rejections are identified below in the analysis of those rejections.

## ANALYSIS OF THE § 112 REJECTION (GROUP A CLAIMS)

The independent claims rejected under 35 U.S.C. § 112, second paragraph, are claims 134, 145, 197, 208, and 253. The Examiner has

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arguments are similar to the Group B arguments.

<sup>9</sup> See *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) ("If an appellant fails to present arguments on a particular issue — or, more broadly, on a particular rejection — the Board will not, as a general matter, unilaterally review those uncontested aspects of the rejection."). Designated as precedential at the following Board website: <http://www.uspto.gov/ip/boards/bpai/decisions/prec/index.jsp>.

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concluded that the term “wireless” in the recited “first wireless circuit” and “second wireless circuit” renders these claims and their dependent claims indefinite.

Claim 134 is representative:

134. A *wireless device* with active and low power modes, *comprising*:

a voltage supply that supplies a first voltage level and a second voltage level that is less than said first voltage level;

*a first wireless circuit;*

*a second wireless circuit;* and

a shutdown module that shuts down said *first wireless circuit* and operates said *second wireless circuit* in said low power mode and transitions from said first voltage level to said second voltage level when transitioning from said active mode to said low power mode, and that operates said *first wireless circuit* in said active mode and transitions from said second voltage level to said first voltage level when transitioning from said low power mode to said active mode, wherein the *wireless device* at least one of transmits and receives data during the active mode, said voltage supply includes a first voltage supply that supplies said first voltage level and a second voltage supply that supplies said second voltage level, and said shutdown module shuts down said first voltage supply in said low power mode.

Claims App. (Br. 54) (emphasis added). Claim 141, which depends on claim 134, more particularly specifies that “said first wireless circuit includes at least one of a baseband processor (BBP) and/or a radio frequency (RF) transmitter.”

Appellants argue that “any person skilled in the art would understand that the first and second wireless circuits, which are recited as being comprised in the wireless device, refer to circuits of the wireless device 48 such as the RF transceiver 52 and the BBP 62.” (Reply Br. 3.) The Examiner’s position is that

[a]lthough device 48 is, as argued, a wireless device and relates to radio communications, the circuits within the device 48 is [sic] not wireless. A person looking at the drawings and reading the claims may possibly be confused and may not understand that the term “wireless circuits”, as intended by applicant, is meant as any circuit (e.g., wired) of a wireless device. Instead, the claimed term “wireless circuits”, gives the notion that the circuits have no wires or that the circuits receive/transmit wirelessly.

Answer 54, para. (10). We agree with the Examiner that it is unclear what, if anything, is intended by applying the term “wireless” to the recited “first . . . circuit” and “second . . . circuit.” The fact that the term “wireless” is not also applied to the recited “voltage supply” or “shutdown module” in the body of the claim suggests that “wireless” as applied to the “first . . . circuit” and “second . . . circuit.” is not simply a reiteration of the fact that the preamble recites a “wireless device” and therefore requires something of the “first . . . circuit” and the “second . . . circuit” that is not also required of the “voltage supply” and “shutdown module.” However, what is required is not clear.

The rejection of independent claims 134, 145, 197, 208, and 253 and their dependent claims 136-44, 146-53, 199-207, and 254-58 under 35 U.S.C. § 112, second paragraph, is therefore affirmed.

Insofar as the rejections of these claims under §103(a) are concerned, we will give “a first wireless circuit” and “a second wireless circuit” the broad interpretation proposed by Appellants.

#### ANALYSIS OF THE § 103(a) REJECTIONS

##### *The Group B claims (1, 18, 31, 48, 61, and 78)*

Of this group of claims, which stand rejected for obviousness over Jokinen in view of Karaoguz and Aoyama (Answer 3-4), Appellants specifically argue only claim 1, which reads as follows:

1. A wireless Ethernet network device with active and low power modes, comprising:

a first voltage regulator that regulates supply voltage during the active mode and that is powered down during the low power mode;

a second voltage regulator that dissipates less power than said first voltage regulator and that regulates supply voltage during the low power mode; [and]

a medium access controller (MAC) device that selects said first voltage regulator during the active mode and said second voltage regulator during the low power mode, wherein the wireless Ethernet network device at least one of transmits and receives data during the active mode.

Claims App. (Br. 34).

Jokinen’s invention is a method and apparatus for controlling the power consumption of an electronic device, such as mobile phone, that includes at least two voltage regulators. Jokinen, col. 4, ll. 30-32, 42.

Jokinen explains that “[i]n mobile telephones there is known a power saving mode, whereby certain circuits, such as the microprocessor circuits

controlling the operation of the mobile telephone, are switched into a mode in which their power consumption is reduced" (col. 2, ll. 9-13). Jokinen explains that the functions of an electronic device, such as a radiotelephone, are generally divided in several sections, so that each section receives its supply voltage from a voltage regulator circuit of its own, which is dimensioned according to the maximum current occurring in the telephone's different operational modes (col. 3, ll. 41-48). According to Jokinen, the combined power consumption of these voltage regulators forms an increasingly significant contribution to the overall power consumption of the electronic device when the mobile telephone is in idle (i.e., low-power) mode (col. 3, ll. 27-35).

Figures 4 and 6 of Jokinen are reproduced below.

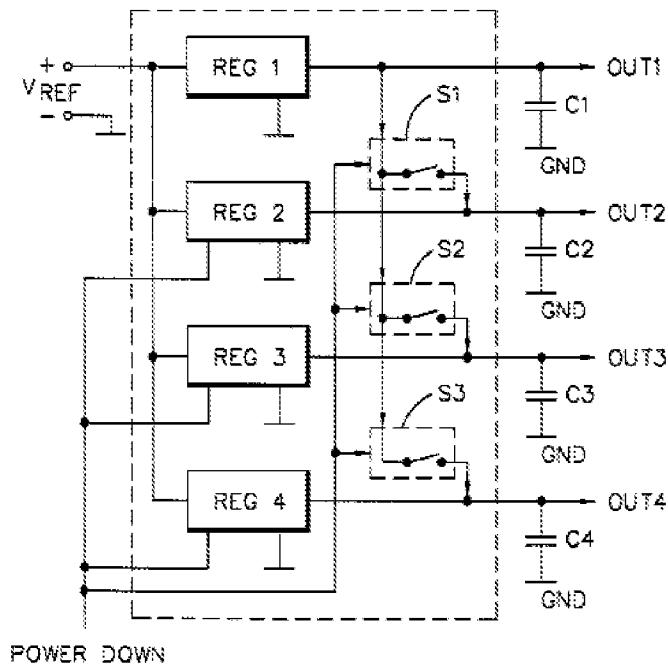


FIG. 4

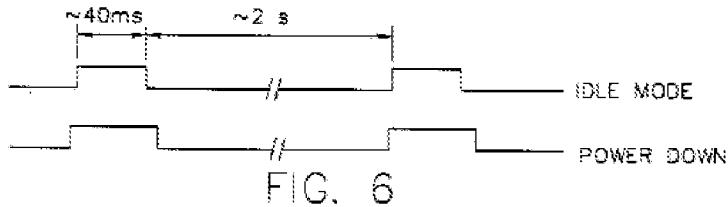


FIG. 6

Figure 4 is a block diagram of a combination of voltage regulators in accordance with Jokinen's invention (col. 7, ll. 15-17). Figure 6 shows pulse diagrams of a power-down signal and an IDLE MODE signal when Jokinen's invention is applied to a mobile phone (col. 8, ll. 22-24).

During normal mode, all of regulators REG1-REG4 are on. Power consumption is reduced by switching off regulators REG2-REG4 and leaving only regulator REG1 on during operation in the low-power (i.e., idle) mode (col. 7, ll. 45-50). During operation in this mode, the output of regulator REG1 is connected to supply the outputs OUT2-OUT4 of the switched-off regulators such that each of outputs OUT1-OUT4 provides a regulated voltage to its associated circuit (col. 7, ll. 50-54). In the low-power mode, there are no currents supplying REG2-REG4 and thus lower power consumption by the regulators is achieved (col. 8, ll. 8-12).

Appellants read the recited "first voltage regulator that regulates supply voltage during the active mode" on one of regulators REG2-REG4 and the recited "second voltage regulator . . . that regulates power during the low power mode" on regulator REG1. *See* Br. 18 ("Jokinen discloses a first voltage regulator (e.g. one of REG 2, REG 3, and REG 4) and a second voltage regulator REG 1." The Examiner appears to agree with reading the recited first

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and second voltage regulators on Jokinen in this manner. Specifically, in response to Appellants' argument that "Jokinen appears to be absent of any teaching or suggestion that the regulator REG 1 dissipates less power than any of the other regulators REG 2, 3, and 4" (Br. 18), the Examiner, without challenging Appellants' above-quoted manner of reading the recited first and second regulators on Jokinen's regulators, explains:

That is the same reason why an obviousness type rejection with the teachings of Aoyama was made. Furthermore, by distributing the voltage of REG 1 (i.e., supplying the power of REG 1) to the outputs of the other regulators, the dissipated power through the outputs is less than the dissipated power when in active mode.

(Answer 55.)

We conclude that the Examiner and Appellants, in reading the recited first and second voltage regulators on Jokinen in the above manner, are giving claim 1 an unduly narrow construction. Claim 1 does not expressly or inherently require that the first and second voltage regulators be formed as separate circuits and therefore is broad enough to permit each of the recited first and second voltage regulators to be read on all four regulators REG1-REG4 and switches S1-S3 at different times. Because power is dissipated by all of regulators REG1-REG4 during operation in the active mode (i.e., when operating as the recited "first voltage regulator") and is dissipated by only regulator REG1 during operation in the low-power mode (i.e., when operating as the "second voltage regulator"), the power dissipated by the second voltage regulator is necessarily less than the power dissipated by the first voltage regulator, as required by the claim. Furthermore, the claim language "select[ing] said first voltage regulator during the active mode and said second

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voltage regulator during the low power mode” is satisfied because the “power down” signal selects operation in either the active mode or the low-power mode. Appellants’ argument that “Jokinen relies on different combinations of a plurality of voltage regulators, none of which is a higher power regulator that is powered off” (Reply Br. 4) fails to take into account that the recited first and second voltage regulators can be read on Jokinen in the above manner.

When claim 1 is read on Jokinen in this way, the only significant difference between claim 1 and Jokinen is that Jokinen fails to disclose using a MAC to select between operation in the active mode and operation in the low-power mode.<sup>10</sup> Jokinen does not explain how the “power down” signal is generated, instead merely stating that the electronic device knows when the circuits supplied by the regulators are in a mode consuming a lower than normal current (col. 7, ll. 45-50). For a teaching of using a MAC to generate the “power down” signal in Jokinen, the Examiner relies on Karaoguz (Office Action 5).

Karaoguz’s invention relates generally to wireless communication systems and more particularly to a radio receiver that selectively powers down the radio receiver elements in a manner that maximizes battery life. Karaoguz [0003], [0011].

Figure 6 is reproduced below.

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<sup>10</sup> Appellants do not dispute the Examiner’s finding that it would have been obvious to employ Jokinen’s voltage regulation circuit in a wireless Ethernet network device.

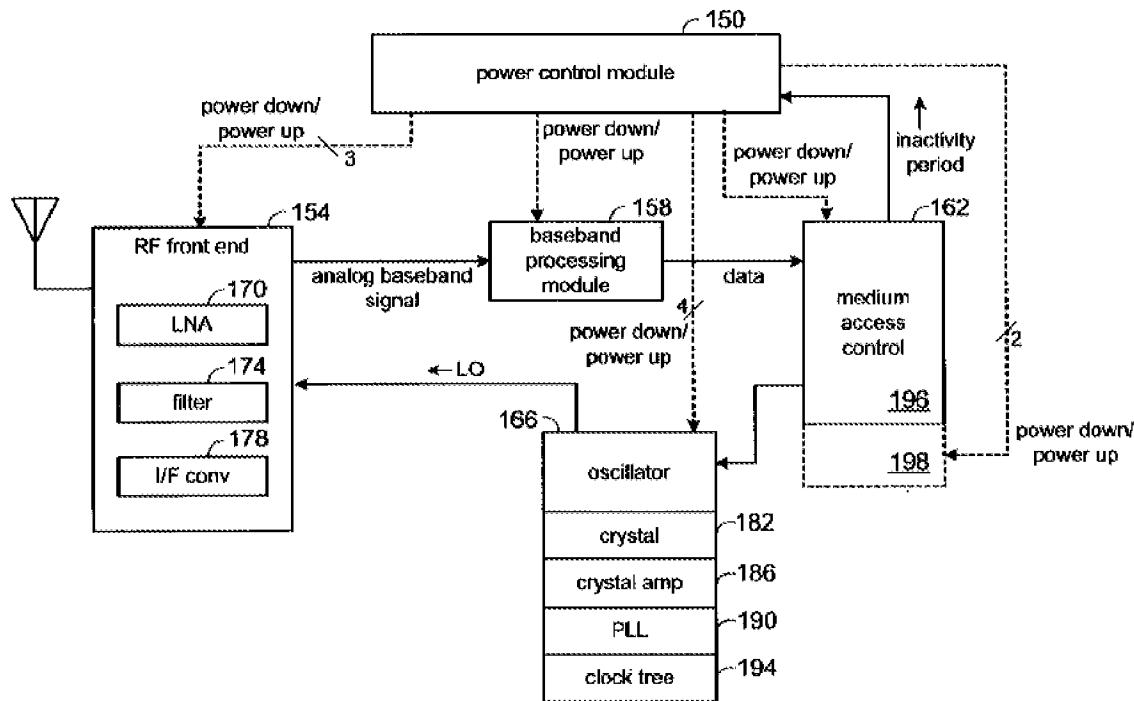


FIG. 6

Figure 6 is a functional block diagram illustrating one embodiment of a receiver path of a handheld host according to Karaoguz's invention (*id. at [0019]*). A power control module 150 is coupled to provide power up and power down signals to each of the radio receiver elements shown in Figure 6 (*id. at [0042]*). As noted by the Examiner (Answer 65), Karaoguz discloses that the power up and power down signals alternatively can be issued by the medium access controller (MAC) 186. *See Specification [0054]* ("In yet another embodiment of the present invention, the power control module (or the MAC) makes the power down and power up decisions and . . ."). Appellants' argument that "the Examiner appears to be relying on the mere existence of a

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MAC device in the secondary reference as motivation for modifying the controller of Jokinen” (Reply Br. 4) is unpersuasive because it fails to address the Examiner’s reliance on Karaoguz for this teaching.

Although claim 1 reads on the combined teachings of Jokinen and Karaoguz in the above manner, in the interest of completeness we have also considered whether, assuming claim 1 does not permit each of the recited first and second voltage regulators to be read on all of regulators REG1-REG4, the claimed subject matter would have been obvious over the combined teachings of Jokinen, Karaoguz, and Aoyama. As noted above, the Examiner and Appellants are reading the recited “first voltage regulator” on one or more of regulators REG2-REG4 and the recited “second voltage regulator” on REG1. The Examiner relies on Aoyama as teaching a device that has active and low power modes and includes a second voltage regulator that dissipates less power than said first voltage regulator. (Answer 5.)

Aoyama’s invention is a single-chip microcomputer capable of reducing power consumption in an electronic device such as a video camera or the like that operates at a plurality of speeds. Aoyama, col. 1, ll. 9-13. Figure 3, on which the Examiner relies, is reproduced below.

FIG. 3

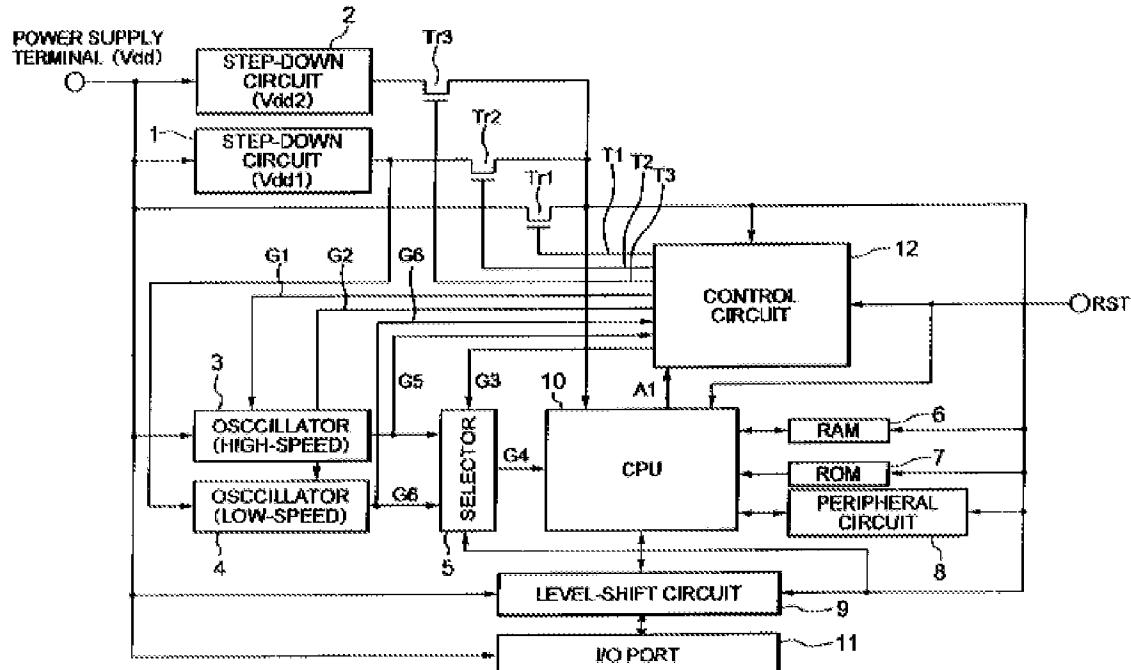


Figure 3 is a block diagram showing a structure of a single-chip microcomputer according to Aoyama's first embodiment (col. 4, l. 9-11). The microcomputer has a high-speed first oscillator 3, a low-speed second oscillator 4, and a selector 5 for connecting the appropriate oscillator to CPU (central processing unit) 10 (col. 5, ll. 5-21). The microcomputer also has three switching transistors Tr1-Tr3 for selectively connecting any of three different operating voltages to the supply terminal of the CPU: (a) the power supply terminal voltage  $V_{dd}$ ; (b) a lower voltage  $V_{dd1}$  generated by stepdown circuit 1; and (c) an even lower voltage  $V_{dd2}$  generated by stepdown circuit 2 (col. 4, l. 54- col. 5, l. 4; col. 5, ll. 29-40). Voltage  $V_{dd1}$  is equal to or higher than a voltage for enabling a circuit operated by a low-speed clock signal to start its operation, whereas voltage  $V_{dd2}$  is equal to or higher than a voltage for

enabling the circuit operated by the low-speed clock signal to hold its operating state (col. 4, l. 66 – col. 5, l. 4).

Figure 6 is reproduced below.

**FIG. 6**

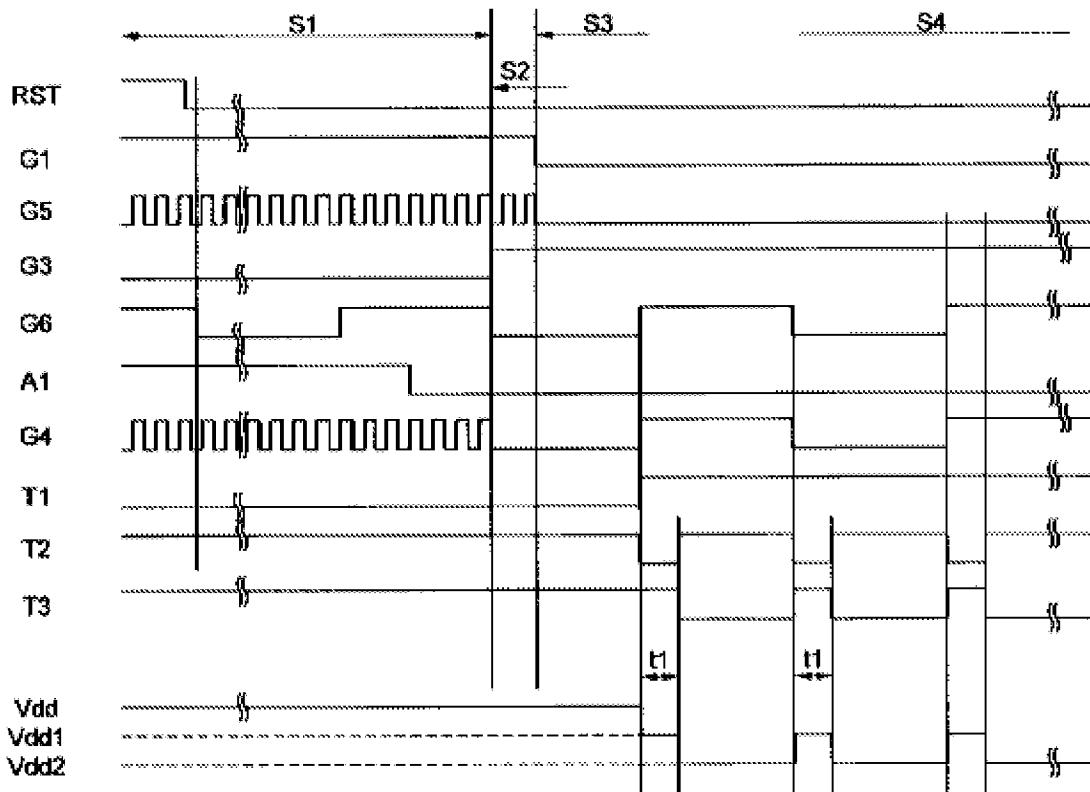


Figure 6 is a timing chart showing operation before and after a high-speed operation is changed to a low-speed operation according to a first embodiment (col. 4, ll. 17-19).

A change from high-speed operation (S1) to low-speed operation is indicated by waveform G4, which shows the output signal of selector 5 (col. 7, ll. 56-58). The voltage selection signals T1-T3 issued by control circuit 12

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thereafter cause the voltage applied to the supply terminal of the CPU (Fig. 6, last waveform) to drop from Vdd to Vdd1 in synchronism with the rising edge of the low-speed clock signal in waveform G4 (col. 7, l. 59 – col. 8, l. 2). After the passage of time t1, the voltage supplied to CPU 10 is further lowered from Vdd1 to Vdd2 (col. 8, ll. 3-9). As a result of switching the voltages in this manner, the channel leakage current can be considerably reduced during low-speed operation, thereby greatly reducing power consumption during low-speed operation (col. 8, ll. 54-59).

The Examiner concluded that

it would have been obvious to one of ordinary skill in this art at the time of invention by appellant to modify Jokinen's second voltage regulator [REG1] to dissipate less power than said first voltage regulator [one or more of REG2-REG4] as suggested by Aoyama for the advantages of enabling respective units and circuits to maintain their operations while reducing power consumption (Aoyama: col. 3, lines 20-31).

(Answer 5.) Appellants argue that “Jokinen already has a specific solution for reducing power consumption” (Br. 18) and that

one skilled in the art presented with Jokinen, which already provides a structure for reducing power consumption, would have no reason to modify the device with Aoyama, which provides a different structure for reducing power consumption. Instead, the Examiner is picking and choosing from Jokinen and Aoyama only so much of these references as will support the Examiner's position, which is impermissible.

(*Id.* at 19) (emphasis omitted).

This argument is unpersuasive. We agree with Examiner that a person skilled in the art would have been motivated to use other known techniques to further reduce power consumption in a mobile phone that employs Jokinen's

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voltage regulator circuitry. The fact that Jokinen already discloses a technique for reducing power consumption does not, in and of itself, constitute a teaching away from also using other prior art techniques for reducing power consumption. *Cf. Depuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.”).

We therefore affirm the rejection of Group B claims 1, 18, 31, 48, 61, and 78 as well as the rejection of their unargued dependent claims 2-17, 32-47, 62-77, and 79-85.

#### *The Group C claims (134 and 197)*

These claims, of which claim 134 is reproduced above in the discussion of the § 112 rejection, stand rejected for obviousness over Kohlschmidt in view of Aoyama and Jokinen (Answer 39). The Examiner relies on Aoyama and Jokinen for the same teachings that are relied on in the rejection of the Group B claims (Answer 40-41).

Appellants argue that “the combination of Kohlschmidt with Jokinen and Aoyama is improper” and that “[a]t a minimum, the combination of Jokinen with Aoyama is improper.” (Br. 21.) Appellants address only the proposed combination of Jokinen and Aoyama, merely repeating (Br. 21-24) their above-discussed, unpersuasive arguments against combining the teachings of those two references. For the reasons given in the discussion of the Group B

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claims, the rejection of claims 134 and 197 is affirmed, as is the rejection of their unargued dependent claims 136-44 and 199-207.

*The Group D claims (145, 208, and 253)*

These claims, like the claims of Group C, stand rejected for obviousness over Kohlschmidt in view of Aoyama and Jokinen (Answer 46). Appellants again only repeat their above-discussed arguments against combining the teachings of those two references.

The rejection of claims 145, 208, and 253 is therefore affirmed, as is the rejection of their unargued dependent claims 155, 157-65, 209-16, and 254-58.

*The Group E claims (26, 56, and 86)*

These claims stand rejected for obviousness over Jokinen in view of Karaoguz and Aoyama (Answer 16).

Claim 26, the only claim that is specifically argued, reads as follows:

26. A *baseband processor* for a wireless Ethernet network device with active and low power modes, *comprising*:

a first voltage regulator that regulates supply voltage during the active mode and that is powered down during the low power mode; and

a second voltage regulator that dissipates less power than said first voltage regulator, and that regulates supply voltage during the low power mode, wherein the wireless Ethernet network device at least one of transmits and receives data during the active mode.

Claims App. (Br. 38) (emphasis added).

The Examiner finds that “Jokinen discloses a processor for a wireless network device (col. 1, lines 13-17; col. 4, lines 40-45) with active and low power modes (col. 3, lines 54-63)” (Answer 16), finds that Jokinen fails to specifically disclose a “baseband” processor (*id.*), relies on Karaoguz for teaching “a baseband processor for a wireless Ethernets network device with active and low power modes (Figs. 1 and 6; Abstract)” (Answer 17), and concludes that it would have been obvious to modify the processor of Jokinen to be a baseband processor because “the baseband processor complies with wireless network devices and are [sic] widely available.” (*Id.*).

In response to Appellants’ argument that Jokinen fails to disclose that the voltage regulators are part of a processor (Br. 27), the Examiner explained that “Jokinen’s voltage regulators and switches (shown e.g., in Fig. 4; col. 6, lines 12-18) process[] the voltage/control signals and any apparatus that processes a signal is fairly characterized as a processor.” (Answer 75.) Appellants argue that it is unreasonable to characterize Jokinen’s voltage regulators and switches as comprising a “processor” because “the term ‘processor,’ as described in the specification and as known to one skilled in the art, refers to a specific component that includes, *for example*, a combination of logic, memory, and digital functions.” (Reply Br. 6) (emphasis added). This argument is unconvincing for two reasons. The first is that the argument offers an example of a “processor” rather a definition of that term, let alone a definition that is shown to have support in the evidence of record. “[A]rguments of counsel cannot take the place of evidence lacking in the

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record.” *Estee Lauder Inc. v. L’Oreal*, S.A., 129 F.3d 588, 595 (Fed. Cir. 1997).

Second, assuming for the sake of argument that the recited “processor circuit” should be understood to be capable of processing data, we are of the opinion that it would have been obvious to employ Jokinen’s voltage regulator circuitry *in* a processor and more particularly in a baseband processor. As already noted, Jokinen explains that known mobile telephones employ a power saving mode, whereby certain circuits, such as the microprocessor circuits controlling the operation of the mobile telephone, are switched into a mode in which their power consumption is reduced (Jokinen, col. 2, ll. 9-13). Furthermore, Appellants do not question the Examiner’s reliance on baseband processing module 158 in Karaoguz’s Figure 6 for a suggestion that the “microprocessor circuits” to which Jokinen refers can take the form of a “baseband processor.” Based on these teachings, we conclude that it would have been obvious to use Jokinen’s voltage regulation circuitry to control the application of power to respective microprocessor circuits, including baseband processor circuits. The term “processor” in claim 26 is broad enough to read on the combination of such microprocessor circuits and Jokinen’s voltage regulation circuitry.

For the foregoing reasons, we will sustain the rejection of independent claims 26, 56, and 86 and their unargued dependent claims 27-30, 57-60, and 87-90.

*The Group F claims (91, 154, and 217)*

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These claims stand rejected for obviousness over Kohlschmidt in view of Amos and Shi (Answer 18).

Claim 91 reads:

91. A wireless device with active and low power modes, comprising:

an oscillator that generates a first reference frequency and a second reference frequency that is lower than said first reference frequency;

a radio frequency (RF) transceiver that communicates with said oscillator and that transmits and receives RF signals;

a baseband processor (BBP) that communicates with said oscillator and said RF transceiver and that performs RF mixing; and

a shutdown module that shuts down said BBP and said RF transceiver in said low power mode and transitions from said first frequency to said second frequency when transitioning from said active mode to said low power mode, and that operates said BBP and said RF transceiver in said active mode and transitions from said second frequency to said first frequency when transitioning from said low power mode to said active mode,

wherein a medium access control (MAC) device includes said shutdown module.

Appellants' arguments regarding the Group F claims require consideration of Kohlschmidt. Kohlschmidt discloses a mobile communications terminal that includes a high-accuracy clock for providing a timebase in a normal mode of operation, a low power "slow clock" for providing the timebase in a low power mode of operation, and at least one processor selectively coupled to the high accuracy clock and the slow clock for

controlling the modes of operation of the mobile communications terminal.

Kohlschmidt, col. 2, ll. 2-10.

Figure 1 of Amos is reproduced below.

FIG. 1

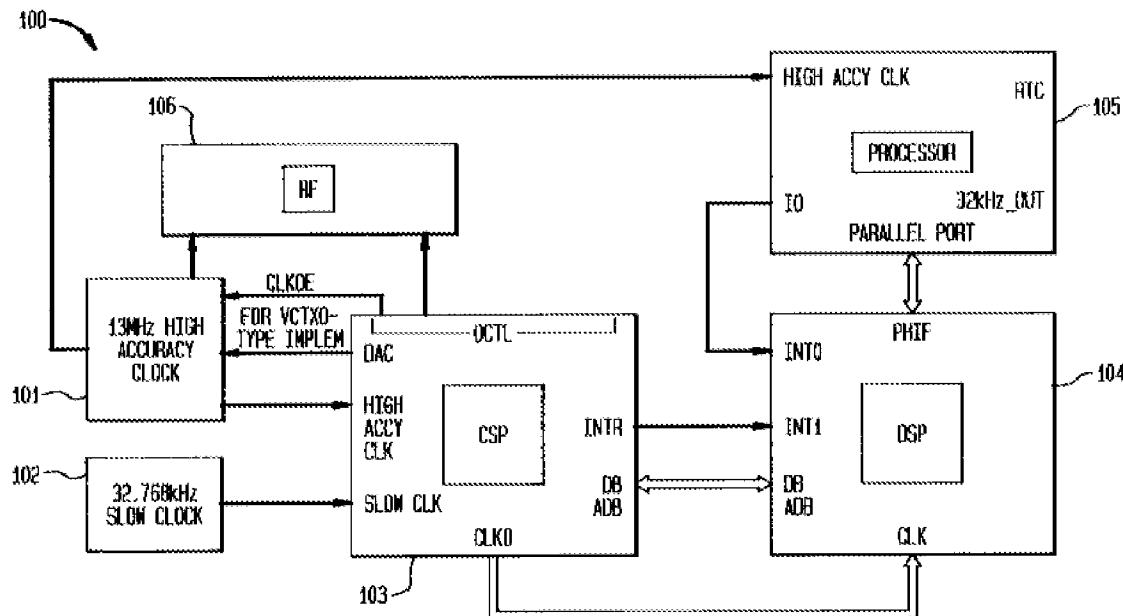


Figure 1 is a block diagram of an exemplary embodiment of Kohlschmidt's invention, which includes high-accuracy clock 101 and slow clock 102 (*id.* at col. 3, ll. 41-45).

In the normal mode of operation, the timebase is maintained from the high-accuracy clock because frequency stability and accuracy of the timing source are essential (col. 2, ll. 21-23). During inactive periods (e.g., in a paging mode), a sleep mode is enabled wherein the high-accuracy clock source is disabled and the DSP (digital signal processor) 104, the CSP (conversion signal processor) 103, and the communications protocol processor 105 are shut down (col. 2, ll. 24-27; col. 3, ll. 9-14). At this time, the slow clock provides

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the timebase for the terminal while a sleep counter is decremented for a given sleep interval (col. 2, ll. 27-30). Because the sleep counter is decremented by clock cycles from the slow clock, the sleep counter will continue to operate in a low-power mode even while all other circuitry is completely shut down (col. 2, ll. 30-33). Specifically, CSP 103, which includes a plurality of registers, interfaces with the DSP 104 to execute the timing control functions for the terminal (col. 3, ll. 16-18).

The Examiner (Answer 19) reads the recited “oscillator that generates a first reference frequency . . . and a second reference frequency that is lower than said first reference frequency” on oscillators 101 and 102, reads the recited RF transceiver on RF segment 106, and reads the recited baseband processor (BBP) on DSP 104, citing Kohlschmidt’s disclosure that DSPs are typically used to process baseband signals (col. 1, ll. 46-51). Furthermore, after noting that Kohlschmidt turns off all of the circuitry except for slow clock 102 and the portion of CSP 103 that contains the counter, the Examiner reads the recited “shutdown module” on CSP 103, which provides a clock output enable/disable signal (CLKOE) to turn the high-accuracy clock 101 on and off depending on the mode of operation of the terminal (Kohlschmidt, col. 3, l. 66 – col. 4, l. 2). (Answer 19.)

Appellants argue that Kohlschmidt, Amos, and Shi fail to disclose or suggest locating the control circuitry in a MAC, as required by the claim. The Examiner has taken alternative positions regarding this requirement. The first position is that Kohlschmidt’s CSP 103 “can be fairly characterized as a MAC device.” Office Action 26; Answer 19. Appellants have not acknowledged this position, let alone demonstrated error therein. Nor have Appellants persuaded

us of error in the Examiner's alternative position, which is that Amos, discussed below, teaches providing a shut-down module in a MAC (Answer 20, 77).

Amos's invention is a clock management scheme that is particularly useful with 802.11 MACs on PCI or Cardbus cards for power reduction. Amos, col. 3, ll. 50-52.

Figure 1 is reproduced below.

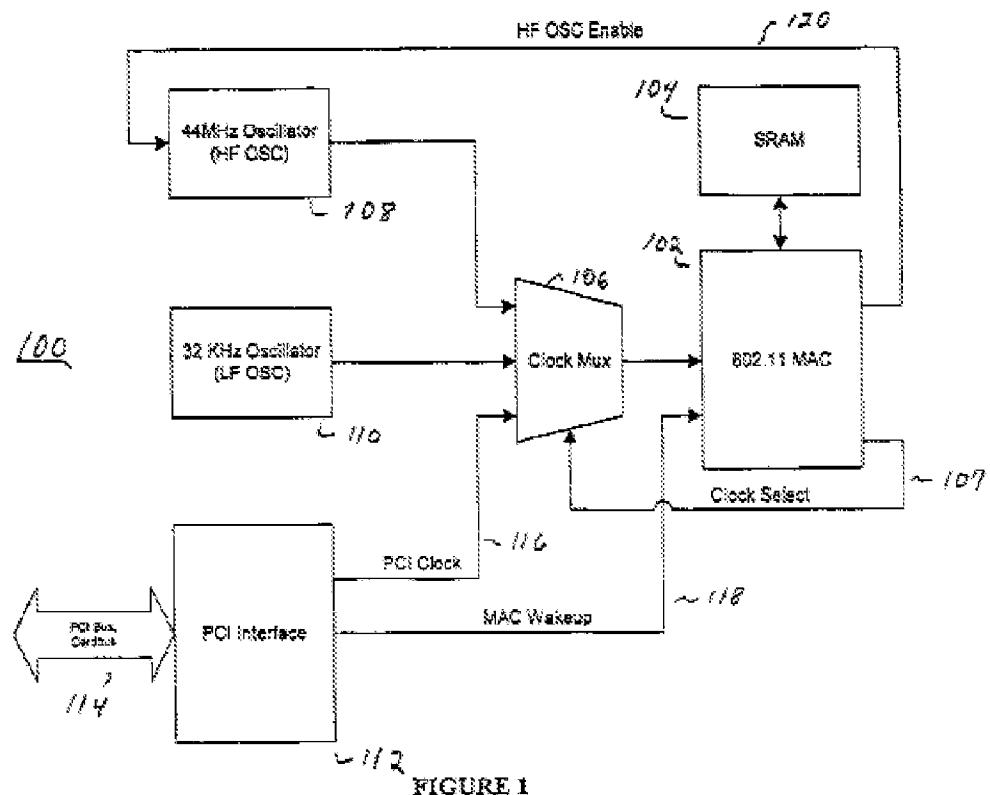


Figure 1 a block diagram of the system of Amos's invention (col. 3, ll. 56-57). MAC 102 receives a clock signal from multiplexer 106, which receives clock signals from a high-frequency oscillator 108, a low-frequency oscillator 110, and a PCI interface 112 (col. 3, l. 61 - col. 4, l. 2). Upon

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entering sleep mode, the MAC controls the multiplexer so as to select the low-frequency clock, signals the high-speed oscillator to turn itself off, and sets a timer in order wake up and handle any 802.11 transactions (col. 3, ll. 4-8).

When the timer expires, the MAC enables the high-frequency oscillator and, after waiting an appropriate interval for it to achieve normal operation, instructs the selection means to switch to the high-frequency oscillator (col. 3, ll. 19-24).

Appellants argue that the rejection is improper because “the MAC of Amos does not shutdown a BBP and an RF transceiver as claim 91 recites, but instead lowers an operating frequency of the MAC itself” (Br. 28). This argument is unpersuasive because, as pointed out by the Examiner (Answer 79), Kohlschmidt is relied on for a teaching of using CSP 103 to shut down DSP 104 (the recited BBP) and the RF segment 106; Amos is relied only for locating the shutdown control circuitry (i.e., the recited “shutdown module”) of Kohlschmidt’s CSP 103 in a MAC.

For the foregoing reasons, we are affirming the rejection of claims 91, 154, and 217 and their unargued dependent claims 92, 94-102, 155, 157-65, and 218-25.

*The Group G claims (103, 166, and 226)*

These claims stand rejected for obviousness over Kohlschmidt in view of Amos, Aoyama, and Shi (Answer 25).

Regarding these claims, Appellants (Br. 29-30) merely repeat the above-discussed, unpersuasive arguments made with respect to the Group F claims.

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We are therefore affirming the rejection of claims 103, 166, and 226 and their unargued dependent claims 104, 106-13, 167, 169-76, 227-31, and 238.

*The Group H claims (114, 177, and 233)*

These claims stand rejected for obviousness over Kohlschmidt in view of Amos, Aoyama, and Shi (Answer 32).

Regarding these claims, Appellants (Br. 30-31) again merely repeat the above-discussed, unpersuasive arguments made with respect the Group F claims. We are therefore affirming the rejection of claims 114, 177, and 233 and their unargued dependent claims 115, 117-22, 178, 180-85, and 234-38.

**DECISION**

The rejection of claims 134, 136-53, 197, 199-216, and 253-58 under 35 U.S.C. § 112, second paragraph, is affirmed.

All of the rejections of claims 1-92, 94-104, 106-115, 117-122, 134, 136-55, 157-67, 169-78, 180-85, 197, 199-238, and 253-58 under 35 U.S.C. § 103(a) are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136. *See* 37 C.F.R. § 1.136(a)(1)(v) (2009).

**AFFIRMED**

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gvw

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